

Rice University
ELEC 220: Fundamentals of Computer Engineering
Course Information, Spring 2015

Instructor:

Joseph Cavallaro, cavallar@rice.edu, Duncan Hall 3042, x4719

Office hours: T,Th 2:30 - 4:00 pm after class

Teaching Assistants: TBA

Course Schedule:

Credits: 4. Lecture: T/Th 1:00-2:15 pm, Brockman 101.

Lab: Abercrombie A116, One of six registrar scheduled sessions starting week of January 19: T 2:30-4:30 pm, T 7-9 pm, W 3-5 pm, Th 2:30-4:30 pm, Th 7-9 pm, F 3-5 pm.

Grading:

Homework: 8 assignments, 3% each = 24%

Labs: 5 assignments, (Demo in lab to a lab assistant), 3% each = 15%

In-Class Activities: About 9 assignments including class participation = 9%

Projects: (Feb.) - calculator 10%, (Apr.) - computer simulator, 12%; total = 22%

Exams: Two, non-cumulative, (late Feb., during Finals) 15% each = 30%

Class participation:

Students are expected to attend both class lecture and lab and are encouraged to ask questions during course meetings throughout the semester.

Course Textbook (Recommended):

Introduction to Computing Systems **2nd Edition** by Patt and Patel, McGraw-Hill Publishers; 2004, ISBN-10: 0-07-246750-9, ISBN-13: 978-0-07-246750-5. Please be sure to purchase the 2nd Edition from 2004 with the blue cover. Supplemental readings will be posted to the class Owlspace site.

Course Description:

This course provides an overview of fundamental topics in computer engineering, including digital logic, computer arithmetic, state machines, instruction-sets, assembly language, linkage conventions, storage hierarchies, interrupts, I/O, systems issues, and an introduction to high level languages, such as C. Generally, the first five weeks focus on digital logic and simulation, the second five weeks on assembly language and computer architecture, and the third five weeks on high level languages, system design issues, and application-specific systems.

Prerequisites:

None. Basic knowledge of computing systems and software design kits will be helpful.

Course Status:

Required for majors in Electrical and Computer Engineering and Computer Science

New for 2015:

We plan to post some videos that cover portions of the class material to allow more time in class for questions and problem solving. We plan to use Brockman 101 to work on small group activities during class, so bringing a laptop will be expected. A Windows or Linux based machine will have easier access to the design and programming tools. We are planning to make available the low-cost Texas Instruments MSP430 Launchpads for individual use starting in February. There may be a small activity fee of approximately \$20 for these development boards. Further details will be available soon.

Course Websites:

<http://owlspace.rice.edu/> We will be using Owlspace for assignments and lab projects and announcements. Also class notes and readings will be posted to the Owlspace site. This syllabus will also be posted to the external <http://www.owl.net.rice.edu/~elec220>

Lab Sessions:

Each student is required to register for and attend a weekly lab session in Abercrombie Labs, A116. Each session is for up to 24 students due to space and equipment limitations. Lab will begin the week of January 19, 2015 for about 13 weeks. The hardware labs are based around an Altera FPGA and a Texas Instruments MSP430 processor and associated design and simulation tools.

Potential Project topics: A calculating circuit based on logic gates, and a simulator for a really little computer.

Lab topics: Digital Logic, Assembly Language Programming, I/O, Traps, and Interrupts, Real-time Sensing, C Language Programming.

Course Goals and Objectives:

At the end of the course, students should be able to understand and analyze the hardware and software components of a modern computer system. They should be able to apply this knowledge to create hardware and software elements to enable new applications. Also, they should be able to evaluate the efficiency and effectiveness of their solutions and remember the basic structure of hardware components and the basic syntax of software languages.

Course Outcomes: Related to ABET Criterion 3 a through k:

The relationships to eleven criteria are listed with 1, 2, and 3. (with 3 as most related.)

a	An ability to apply knowledge of mathematics, science, and engineering.	3
b	An ability to design and conduct experiments, as well as to analyze and interpret data.	
c	An ability to design a system, component, or process to meet desired needs.	3
d	An ability to function on multi-disciplinary teams.	1
e	An ability to identify, formulate, and solve engineering problems.	2
f	An understanding of professional and ethical responsibility.	
g	An ability to communicate effectively.	
h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.	

i	A recognition of the need for, and an ability to engage in life-long learning.	
j	A knowledge of contemporary issues.	
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	3

Honor code policy:

General Assignments: When working in groups for labs and projects, your group counts as a single individual for this policy, and your group receives a single score. You may use your text, course notes, and any other reference material (that is not a solution). You may discuss problems, general strategies, or algorithms with other people (in the course or not). When partnering, you should understand and be able to recreate any part of the solutions on your own. For all assignments, you may NOT use solutions from past classes or found on the web. You may not obtain code from anyone (in the course or not), aside from code provided as part of the course.

Exam Honor Code: Complete all exams individually.

Homework Honor Code: Complete homework assignments individually. Please list your name on the submitted solution. Solutions submitted after the date and time specified will receive no credit. You may freely use the 2015 course notes, the course textbook, or course handouts for the assignments. Students may discuss and compare ideas on the homework assignments, but each student must write up solutions individually without resort to copying. That is, students must not create submissions together; students may discuss problems, but may not actually write up their assignments together. You should also not refer to solutions posted on the web or from previous years' classes. Clearly state any assumptions that you make in order to solve the problems, and show all your work.

Students with Disabilities:

Any student with a disability requiring accommodations in this course is encouraged to contact the instructor after class or during office hours. Additionally, students will need to contact Disability Support Services in the Ley Student Center.

Updates to the Course:

Information contained in this course syllabus, other than the absence policies, may be subject to change with reasonable advance notice as appropriate.

Last updated: January 8, 2015